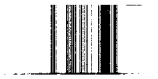
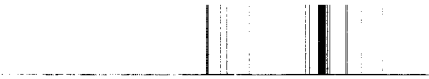


HOW FEDERAL POLICIES AFFECT THE STEEL INDUSTRY

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PREFACE

Actions of the federal government affect the steel industry through a variety of avenues. Among these are trade, tax, antitrust, research, and environmental policies. This paper examines how each of these policies affects the industry's ability to invest and compete. The report was requested by the Subcommittee on Investigations and Oversight of the House Committee on Science and Technology. In keeping with the mandate of the Congressional Budget Office (CBO) to provide objective analysis, no recommendations are made.

The report was prepared in CBO's Natural Resources and Commerce Division, under the supervision of Everett M. Ehrlich and Elliot Schwartz. Its several chapters and appendixes were written by Roger C. Dower, Everett M. Ehrlich, Daniel P. Kaplan, Thomas J. Lutton, Susan Punnett, Elliot Schwartz, and Philip C. Webre. The econometric simulations were performed by Andrew W. Horowitz under the direction of Thomas J. Lutton. Valuable comments on a preliminary draft were made by reviewers at the Department of Commerce and the Pension Benefits Guarantee Board, but responsibility for the finished product rests with CBO. The report was edited by Francis Pierce and prepared for publication by Kathryn Quattrone, assisted by Pat Joy.

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Director

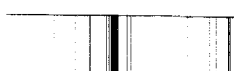
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CONTENTS

	SUMMARY	ix
I	INTRODUCTION	1
	Structure of the Steel Industry	1
	Problems Facing the Steel Industry	2
	Capital Formation in Steel	8
II	CAPITAL INVESTMENT AND TAXES	15
	Steel Under the Old Law	15
	Steel and the New Tax Law	17
	Conclusions	23
III	FEDERAL FUNDING OF STEEL RESEARCH	25
	Direct Federal Funding	25
	Research and Development Tax Credit	31
IV	IMPORT RESTRAINTS, MERGERS, AND PLANT CLOSINGS	33
	Import Restraints	33
	Mergers, Acquisitions, and Antitrust Policies	36
	Reducing Capacity	39
V	THE EFFECTS OF ENVIRONMENTAL REGULATION	43
	Pollution Control Expenditures	44
	Regulation in the Future	49



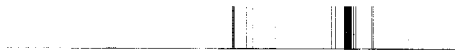
VI	IMPLICATIONS FOR POLICY	51
	Research and Development	52
	Efforts to Restructure the	
	Steel Industry	54
	Managing the Transition to	
	a Smaller Industry	55
APPENDIXES		
A	Description of the Congressional	
	Budget Office Steel Model:	
	A Small-Systems Model	59
B	Results of Policy Simulations	63

TABLES

1.	Growth in Apparent Steel Consumption	6
2.	Steel Capacity, Production, and Operating Rates	10
3.	Steel Industry Profits	11
4.	Moody's Bond Ratings of Selected U.S. Steel Producers, 1980-1986	12
5.	Effective Tax Rates on Plant and Equipment, Selected Industries, 1985	18
6.	Federal Funding of Steel-Related Research	26
7.	Iron and Steel Industry Pollution Control Costs, 1981	44
B-1.	Effects of Quotas on the Steel Industry	64
B-2.	Effects of Investment Tax Credit Refunding on Output, Employment, and Investment in Steel	65
B-3.	Impact of Reduced Environmental Capital Expenditures on the Iron and Steel Industry	66

FIGURE

1.	Annual Changes in U.S. Steel Consumption and in Real Gross National Product, 1971-1985	7
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SUMMARY

The integrated sector of the U.S. steel industry is in decline. Both output and employment in the industry have fallen significantly from the highs reached in the early 1970s. Some concern has been expressed as to whether capital formation in the sector is adequate to its needs, and whether policies of the federal government may have inhibited new investment. This paper reviews the federal policies affecting capital formation in steel. Those policies do not appear to have deterred investment in the steel industry, and in some cases - - most notably, trade restraints - - may have promoted it.

By and large, the problems facing the integrated sector of the steel industry (the sector with the largest producers) stem from causes unrelated to federal policy. Declining demand for steel products is probably the single largest factor. No steps the industry takes to improve its position can overcome this trend. Another of the industry's problems involves costs. Partly because of its own mistakes, and partly because of economic forces beyond its control, the integrated sector finds itself at a cost disadvantage relative to minimill producers (smaller-scale domestic steelmakers) and foreign steelmakers. Many analysts of the industry also point to an overhang of excess production capacity as inhibiting steel modernization. Firms may be hesitant to close their older facilities because of "shutdown" costs that often include expensive labor payments. In order to avoid these costs, they may sell steel at prices substantially below full cost when the market permits, discouraging investment in more modern facilities. Federal policy has had a negative effect on the steel industry insofar as fiscal policy has driven up the exchange rates of the dollar. But fiscal policy affects mainly the short-term prospects of the industry, and since the policy appears to be more stable now than it has been over the last decade, it should not be a major deterrent to capital formation generally, which increases the demand for steel. Indeed, forecasts of lower interest rates and exchange rates in coming years should encourage the demand for steel.

Although the steel industry is currently undergoing net disinvestment, it still adds an average of \$2.5 billion each year to its gross stock of capital. Some analysts believe that the industry requires up to twice that amount to become competitive. Such calculations appear to be made on technological

rather than economic grounds, however. Current levels of capital formation in the industry reflect the low rate of return to such investments and appear to correspond well to investors' estimates of the industry's prospects. Using technological or other criteria as a guide to capital formation in the steel industry could draw resources away from more economically productive uses.

Moreover, higher levels of investment would probably do little to increase total sales and employment in steel. The primary sources of the industry's decline--most notably, falling steel consumption and the overhang of excess capacity--would be unaffected or even worsened by higher levels of investment. New investment in the industry also tends to be labor displacing and so would not improve employment prospects.

FEDERAL POLICIES

The federal government does not have a coordinated policy toward the steel industry, although a number of its programs and activities impinge on the industry. The government directly affects capital formation in steel through tax policy, research and development spending, import restraints, antitrust policy, and environmental regulations.

The tax rates paid by steel companies are about the same as those paid by the average manufacturing firm of equal profitability. This is particularly true now that the 1986 tax reform aims at greater neutrality among corporate taxpayers. But the new tax law even provides the industry with two exceptional benefits. First, the transition rules allow steel companies a refund on unused investment tax credits, which total \$500 million for the 10 largest firms in the industry. These firms have been unable to use the tax credits because they have not been profitable enough to pay taxes. Second, as a permanent feature, the law permits the steel companies to use accumulated net operating losses (over \$7 billion at present) to offset future income that would otherwise be taxable.

Federal agencies currently fund about \$24 million a year in research that could aid innovation in the steel industry. Most of this research focuses on ways of making steel cheaper to produce, through savings on energy and materials and increased process control. The Department of Energy and Department of the Interior fund roughly \$12 million in research on conserving steel inputs, while the National Science Foundation and the National Bureau of Standards spend \$10 million on manufacturing process control. Federal R&D support, however, is small compared with the industry's own efforts.

Import restraints offer the steel industry a shield from foreign competition. But protective measures in the 1960s and 1970s did little to restore the industry's competitiveness, and the current voluntary restraints negotiated with foreign producers seem unlikely to be more effective. The CBO steel model suggests that the restraints will increase capital formation and employment only slightly, and at considerable expense to consumers who must pay higher prices for steel than they would otherwise. Moreover, the gains will be short-lived once restraints are removed.

Antitrust policy tends to prevent mergers and acquisitions that could allow more efficient use of existing capacity or an infusion of new capital or management expertise. This policy clearly operates at cross purposes with trade policy. While the government has imposed trade restraints that operate to raise the steel industry's cash flow by restricting supply and raising prices, antitrust policy tends to keep prices down by ensuring a diversity of producers.

Environmental regulations have imposed costs on all domestic industries. In the 1970s the steel industry spent 10 percent to 20 percent of its investment funds on pollution controls. The effects of this spending on the health of the industry are unclear. The CBO steel model suggests that the expenditures were not an important factor in the industry's performance.

POLICY IMPLICATIONS

The analysis in this report shows that the policies of the federal government have not inhibited steel industry investment. The current low level of investment in the industry is a symptom, not a cause, of its decline. This suggests that other approaches to the problems of the steel industry could be more effective than trying to stimulate investment.

One approach would emphasize research and development directed toward new technologies in steel production. Its rationale is that private incentives to increase R&D are limited, since private innovators never realize the full return on their innovations. Beyond this, the financial condition of the steel industry currently inhibits it from investing in research to increase productivity. The proposal is frequently made to establish joint public-private industrywide technology centers, similar to those envisioned by the Congress when it created Centers for Generic Technology in 1980. A drawback to this proposal is that a decade or more may be required to commercialize revolutionary steelmaking technologies. Moreover, the proposal raises management issues regarding the research agenda, dissemination conditions, and financing arrangements that are difficult to resolve.

Along with research and development, the government could take an active hand in restructuring the steel industry. Such a policy would seek to facilitate the closing of antiquated plants, encourage mergers, and assist in rationalizing the industry to serve a smaller market.

Finally, rather than intervening, the federal government could adopt a policy of assisting dislocated workers. Such assistance could include relocation and retraining. Such a program was available under the Trade Adjustment Assistance Act, but workers generally opted to receive income support instead of retraining, in the hope that their jobs would return. This problem may not recur in the steel industry. Opponents of such a policy note that workers elsewhere in the economy are displaced from their jobs for a variety of reasons, and that special treatment for one industry's labor force may be inequitable.

CHAPTER I

INTRODUCTION

The U.S. steel industry is in long-term decline. Some facts and figures quickly reveal the dimensions of the problem. Domestic steel production today is at less than 60 percent of its 1973 level. Steel consumption, after peaking at 122.5 million tons in 1973, has fallen steadily to about 90 million tons in 1986. This level is substantially higher than the 74.7 million tons consumed in the recession year of 1982, but consumption is not projected to increase much beyond today's levels. Employment in steel, which was over 600,000 in 1973, now stands at less than 200,000. Moreover, worldwide overcapacity in steelmaking constrains prices and depresses profits to negative levels. In 1985, imports accounted for 25 percent of U.S. steel consumption; steel product prices were falling; and after-tax losses in the U.S. industry were \$1.25 billion.

STRUCTURE OF THE STEEL INDUSTRY

The U.S. steel industry includes three distinct sectors: integrated producers, specialty-steel producers, and minimills.^{1/} The problems of the industry are most severe among **integrated producers**, which are the traditional core of the industry. These are typically multiplant firms with multiple operations. They own their own raw material properties, transportation networks, and sometimes even manufacturing plants that use steel. Integrated producers generally process steel through all its phases of production, from coke oven and blast furnace to rolling mills. Competition from foreign producers and from domestic minimills has reduced the market share of integrated firms from over 80 percent in 1950 to under 50 percent now.

Specialty steel producers typically begin with scrap steel, which they melt in electric furnaces to produce higher-valued, special-applications products such as alloy, stainless, and tool steels. These are gradually in-

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1. For a fuller treatment of the industry's structure see Congressional Budget Office, *The Effects of Import Quotas on the Steel Industry* (July 1984).

creasing as a share of total U.S. steel output. This sector also includes the specialty steel operations of integrated firms, but most of the output comes from a large number of small, specialized producers whose product is distinctly different from nonspecialty or "carbon" steel.

Minimills also melt scrap in electric furnaces, but they produce carbon-grade steel that competes with the output of integrated producers. Minimills typically use a technologically advanced process known as continuous casting. Since 1960, minimills have increased their market share from about 3 percent to over 20 percent.^{2/} They have proved to be profitable, technologically advanced, and competitive with foreign producers. Their output, however, tends to be restricted to less sophisticated products that do not compete with the full range of products offered by the integrated sector.^{3/} The success of the minimill sector portends a restructuring of the industry into one that will be smaller, more fragmented, regionally focused, less unionized, and technologically more modern.

PROBLEMS FACING THE STEEL INDUSTRY

Economic forces have reduced the steel industry (particularly the integrated sector) from one of the most profitable U.S. industries, providing an engine of growth for the economy, to one of the least profitable. Some of the industry's difficulties are of its own making; others stem from forces beyond its control. Three factors that have contributed to the integrated sector's decline are: high costs and technological backwardness; the reduction in steel use in the U.S. economy; and general economic conditions, including high exchange rates.^{4/}

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2. See Donald F. Barnett and Robert W. Crandall, *Up From the Ashes* (Brookings Institution, 1986), p. 9.
 3. Over time this may change. One of the leading minimill operators recently announced plans to build the first minimill capable of producing sheet steel from slab. See *American Metal Market*, "Nucor's Thin-Cast Sheet Facility To Be On-Stream in First Half of '89" (January 7, 1987), p. 1.
 4. The analysis that follows draws in part on the CBO Steel Industry Model. This multi-equation model has been used to simulate steel industry performance under a variety of assumptions. References in the text to the CBO steel model refer to the results of these simulations. For more information on the model, see Appendix A.

High Costs

Foreign producers are able to make steel at lower cost than U.S. integrated producers, partly because of lower labor costs but also because they enjoy raw material and capital cost advantages. Estimates of the costs of producing steel in 1980 gave foreign producers a 17 percent to 30 percent price advantage, depending on the number of products measured and the scope of cost coverage.^{5/} The recent devaluation of the dollar has improved the price competitiveness of the industry somewhat, but significant disadvantages remain.

Labor costs account for roughly 30 percent of the total cost of steel produced in the United States. In the 1950s, high labor costs were offset by high output per worker. But foreign productivity in steel now meets or exceeds U.S. levels, while U.S. hourly compensation (wages plus other benefits) remains relatively high. One measure of relative labor costs is the hourly compensation of steelworkers compared with that of all manufacturing workers. U.S. steelworkers received 97 percent more than the average manufacturing worker in 1982, and 63 percent more in 1984. In Japan, compensation for steelworkers was 73 percent higher than that of all workers in 1984, but Japanese steelworkers still earned 80 percent less than their American counterparts (at 1984 exchange rates).^{6/}

In raw materials, foreign producers also have cost advantages. U.S. producers have depleted the deposits of low-cost, high-quality iron ore that initially gave them a competitive advantage, and have been forced to turn to sources outside North America. Iron ore from these sources is expensive to transport to U.S. plants, which are not located near deep-water ocean ports. Iron ore represents roughly 15 percent of the total costs of

5. See Congressional Budget Office, *The Effects of Import Quotas on the Steel Industry* (July 1984), p. 25. For the 1986-1989 period, the CBO steel model projects a price advantage for foreign producers of 15 percent to 20 percent. This is significantly less than the 40 percent differential that existed in 1984 (part of the difference being the result of lower exchange rates).

6. Figures are based on unpublished BLS data. In Canada, steelworker compensation was 35 percent greater than the all-manufacturing average; in Germany it was 10 percent. See Congressional Budget Office, *Has Trade Protection Revitalized Domestic Industries?* (November 1986), pp. 41-44.

producing steel. U.S. producers paid almost 50 percent more per ton than Japanese producers in 1984.^{7/}

Production facilities in the United States are older than many facilities elsewhere, and lack some productive improvements that have been incorporated in newer foreign plants. Only one new integrated steel plant has been built in the United States since the 1950s. U.S. producers have modified or retrofitted existing plants to incorporate innovations (such as basic oxygen furnaces) that have improved the efficiency of steel production, but many of the most significant innovations, such as continuous casting and automated process controls, have been less widely adopted. Basic oxygen furnaces accounted for 59.4 percent of U.S. crude steel production in 1985, compared with 70.7 percent of Japanese production. Similarly, about 40 percent of U.S. production is continuously cast, while in Japan the ratio is close to 90 percent.^{8/} From an engineering perspective, U.S. producers could increase their efficiency by building new facilities (so-called green-field plants) designed around these innovations, but the costs of doing so would be prohibitive.^{9/}

Some foreign governments give subsidies to their steel producers. These subsidies have not only financed construction of modern facilities, but have also been used to maintain operations and preserve jobs at inefficient mills. As a result, worldwide capacity and output are greater than they would otherwise be, and prices are lower. In an effort to end these subsidies by national governments, the European Community has established quotas on production and imposed import restraints. Nevertheless, some countries that belong to the EC continue to subsidize their industries. Even if foreign subsidies stopped, however, world overcapacity is so great that U.S. producers would still be under very heavy competitive pressure.

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7. See Congressional Budget Office, *The Effects of Import Quotas on the Steel Industry* (July 1984).
 8. Both the basic oxygen process and continuous casting represent more productive technologies than traditional methods. The basic oxygen process is an improvement on the traditional Bessemer method of steelmaking that accelerates the refinement process and reduces fuel costs. Continuous casting involves pouring molten steel directly into finished shapes, thus simplifying the production process while raising yields, improving product quality, and reducing energy needs.
 9. Barnett and Crandall estimate that high construction costs would prevent a new integrated steel plant from producing steel as cheaply as an existing efficient integrated plant. See *Up From the Ashes*, pp. 52-55.

Falling Steel Consumption

Steel consumption in the United States and other developed countries is falling, and this is as significant a fact in the steel industry's decline as the competitive constraints described above. As shown in Table 1, consumption of steel in the United States has grown at a very slow rate in the postwar period relative to consumption in other countries, although growth has now slowed in those countries as well. The decline in steel consumption stems from a variety of sources. First, the United States has already built most of its large, steel-intensive investments, such as in infrastructure (ports, railways, roads, and bridges). Second, technological progress has increased the competition from new materials such as plastics, and new uses are being found for such older materials as aluminum, concrete, ceramics, and even woven fabrics of composite materials such as are used in aircraft and automobiles. The switch to competing materials is a result partly of their superior performance characteristics and partly of their lower costs; since 1947, the average price of steel mill products has risen nearly twice as fast as that of all other materials.^{10/} Technology has also improved the performance of steel so that less steel is required for each application. Finally, the shifting of economic activity from manufacturing into services, which are relatively less steel-intensive, has also reduced the demand for steel products.

An opposite trend is occurring in newly industrializing countries such as Brazil, Korea, and Mexico, which are developing manufacturing industries and building their infrastructure. They have also acquired the technology necessary to build large-scale, efficient steel facilities.^{11/} Steel output in developing countries has doubled since 1973, and the increase in U.S. steel imports has come largely from that source.

Macroeconomic Conditions

Along with the specific problems described above, the steel industry has suffered from the changing mix of monetary and fiscal policy over the past

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10. Department of Labor, Bureau of Labor Statistics, *Producer Price Index for Steel Mill Products versus All Intermediate Materials Used in Manufacturing*.
 11. The construction of a steel plant is a labor-intensive process. Because of their lower labor costs, developing countries have an advantage in building steel plants. See Congressional Budget Office, *Has Trade Protection Revitalized Domestic Industries?* (November 1986), p. 45.

decade. The industry is especially sensitive to economic fluctuations and changing interest rates.

Steel is a pro-cyclical industry. As the economy goes through cyclical expansions and contractions, steel output rises and falls more than other economic activities (see Figure I). In 1982, for example, when overall economic output fell by 2.6 percent, steel consumption fell by 25.6 percent. As the economy recovered in 1983, growing by 3.5 percent, steel consumption grew by 6.3 percent. These wide swings make investment planning in the industry difficult; they also discourage capital improvements, and make management reluctant to retire outdated plants that may become profitable in boom years.

Steel is also highly sensitive to interest-rate movements, not only because these movements influence the business cycle but because the demand for steel is derived from the demand for products that use steel, such as automobiles, investment goods, and construction, which in turn are sensitive to interest rates. (The automobile, construction, and machinery industries account for over 60 percent of steel consumption.) High real interest rates, exacerbated by federal deficits, have discouraged investment during the 1980s by raising the cost of capital and at the same time making alternative uses of investment funds more attractive than additional investment in steelmaking.

TABLE 1. GROWTH IN APPARENT STEEL CONSUMPTION
(Compound annual percentage rates, 1950-1984) ^{a/}

Period	U.S.	Japan	Canada	U.K.	EC ^{b/}
1950-1981	1.0	9.8	3.1	0.3	3.6
1950-1960	0.4	17.3	2.5	3.3	8.3
1960-1969	4.3	13.1	6.8	2.5	5.6
1969-1984	-2.4	0.0	0.0	-3.6	-1.3

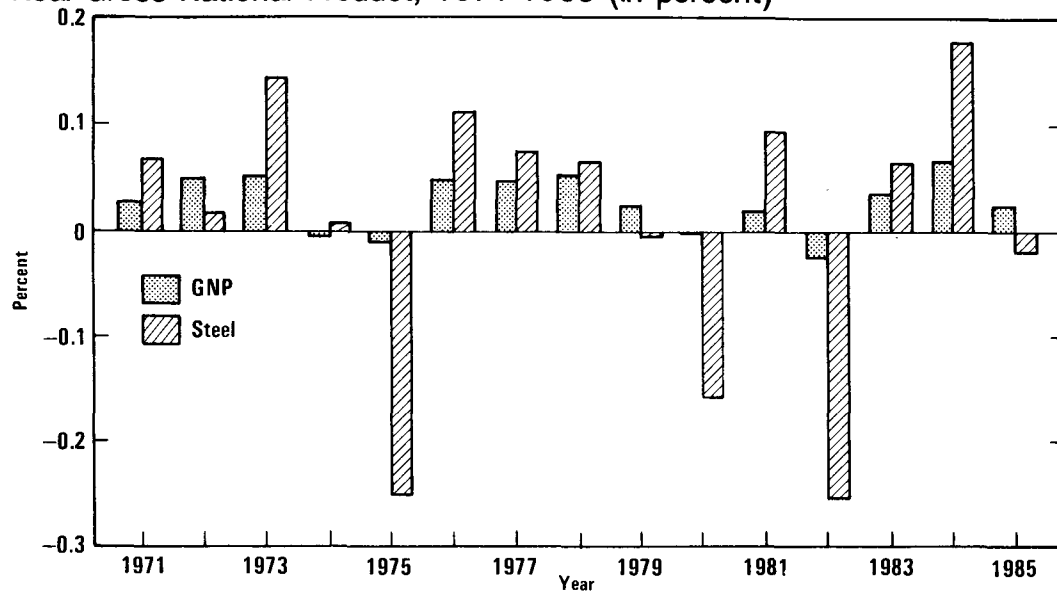
SOURCES: Federal Trade Commission, *Staff Report on the U.S. Steel Industry and Its International Rivals* (1977); International Iron and Steel Institute, *Statistical Yearbook* (various years).

a. Calculated from three-year averages on a basis of crude-steel equivalents.

b. Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany.

Figure 1.

Annual Changes in U.S. Steel Consumption and in Real Gross National Product, 1971-1985 (In percent)



SOURCE: Congressional Budget Office.

Exchange rates derive from macroeconomic conditions, but represent a separate and painful problem for the steel industry. Rising exchange rates from 1980 through 1984 added a crippling blow to an already weakened industry. Estimates of the effect of the appreciating dollar on domestic industrial production conclude that primary metals (including steel) were the hardest hit of all--with production declining by roughly one-half of 1 percent for each 1 percent rise in the exchange value of the dollar.^{12/}

12. See Congressional Budget Office, "The Dollar in Foreign Exchange and U.S. Industrial Production" (December 1985) and William H. Branson and James P. Love, "Dollar Appreciation and Manufacturing Employment and Output," National Bureau of Economic Research, Working Paper No. 1972 (July 1986). Using somewhat different techniques and estimation procedures to calculate the impact of exchange rates on industrial production, these two papers reach similar conclusions. Branson and Love estimate that a 1 percent change in the exchange rate changes steel production by -0.54 percent; the CBO estimate was -0.48 percent. Estimates for primary metals were the highest obtained among all industries analyzed. Simulations using CBO's steel industry model yielded comparable results, an implied -0.51 percent change in domestic steel production stemming from a 1 percent rise in the exchange rate.

Although exchange rates have retreated from previous highs, they still remain about 30 percent above 1980 levels and cannot be counted on to provide much additional stimulus to the industry. This is particularly true because of the disparate trends in bilateral dollar exchange rates: the dollar has fallen dramatically against the Japanese yen, West German mark, and other currencies of the developed countries, but has not changed significantly or has even appreciated against the currencies of such developing-country steel producers as Korea, Mexico, and Brazil.

Future Prospects

There is no reason to believe that the fundamental trends described above will change, although the macroeconomic picture may brighten a bit. The minimill sector remains healthy, although technological constraints appear to limit its share of the steel market (a share sometimes estimated at 35 percent). In the rest of the steel industry, cost advantages clearly favor newer producers in the industrializing countries. The CBO model projects a decline in U.S. production costs as a result of lower factor costs and technological improvements. But by international standards, costs of production in the integrated sector will remain high. Even if technological breakthroughs in the United States were to overcome this cost advantage, the industry would still have to contend with declining steel consumption and with vigorous competition from other materials.

In the short term, the industry may benefit from more stable economic conditions than have prevailed in the recent past. The CBO forecast anticipates stronger overall investment and a declining exchange rate, both of which should improve the demand for steel products somewhat.

CAPITAL FORMATION IN STEEL

From one perspective the integrated sector's problems are related to a lack of capital formation. The integrated steel producers could become more competitive if they were to invest in new technology that would enhance productivity. Such investment does not come cheaply. The American Iron and Steel Institute states that adequate modernization would require investments of over \$5 billion per year, a sum greatly exceeding the current annual average of about \$2.5 billion.

A somewhat different perspective is suggested by two facts: first, that net capital formation in the integrated sector has been falling, as ship-

ments and use of capacity have declined; and second, that falling profits imply that greater returns can be achieved through investment elsewhere.

The Decline in Net Capital Formation

As analyzed above, demand for steel products has been declining. Consequently, domestic steelmaking capacity far outstrips current needs, leading producers to cut capacity where possible in order to improve productivity. As shown in Table 2, annual steelmaking capacity remained roughly constant at about 155 million net tons from 1973 to 1982, then fell by about 13 percent from 1982 to 1985. But the production of crude steel dropped more than 40 percent during the same period, from 150.8 million net tons in 1973 to 87.6 million in 1985, meaning that use of capacity fell from 97.3 percent to 65.3 percent. (In the recession year of 1982, it hit a low of 48.4 percent.) The CBO steel model shows capacity continuing to fall slowly over the forecast period, with use of capacity first rising and then falling back to current levels.

These capacity reductions show that steel firms have responded to falling demand by disinvesting in steelmaking capacity--that is, by closing plants and writing off the assets from corporate balance sheets. Capacity reductions allow operating rates to increase, thus reducing production costs. Investment funds can then be concentrated at the most efficient plants, further improving the industry's competitive prospects. While such actions have severely negative effects on local communities, they are an effort to achieve the necessary end of reducing costs.

The Decline in Profitability

Financing capital improvements has been, and probably will continue to be, a problem for the integrated producers for two related reasons. First, internal sources of financing--that is, profits (and depreciation allowances)--have been nonexistent in recent years and are not likely to be significant in the near future. Second, external sources of financing, which also take their cue from profitability, have dried up because of the high risk and low potential return of investments in steelmaking capacity.

Since 1982, after-tax profits in the steel industry have given way to losses. The CBO steel model projects that the industry will show profits again in 1986-1989, partly on the assumption of lower exchange rates and higher steel prices. But the relative profitability of the industry is best

measured in terms of the rate of return to capital. Compared with other industries, the rate of return to capital invested in steelmaking has been very low (see Table 3). Although after-tax profits achieved substantial levels during the 1970s, profits as a percent of stockholder equity were

TABLE 2. STEEL CAPACITY, PRODUCTION, AND OPERATING RATES

Year	Annual Capacity (millions of net tons)	Crude Steel Production (millions of net tons) ^{a/}	Use of Capacity (percent)
Actual			
1973	155.0	150.8	97.3
1974	155.6	145.7	93.7
1975	153.1	116.6	76.2
1976	158.3	128.0	80.9
1977	160.0	125.3	78.4
1978	157.9	137.0	86.8
1979	155.3	136.3	87.8
1980	153.7	111.8	72.8
1981	154.3	120.8	78.3
1982	154.0	74.6	48.4
1983	150.6	84.6	56.2
1984	135.4	90.7	68.3
1985	134.1	87.6	65.3
Projected			
1986	135.1	86.5	64.1
1987	130.8	90.5	69.2
1988	129.2	91.6	70.9
1989	128.8	90.5	70.3
1990	128.6	88.6	68.9
1991	128.4	86.4	67.3
1992	127.9	84.1	65.7

SOURCES: Historical data are based on the *Annual Statistical Report* of the American Iron and Steel Institute. Projections are based on the CBO steel model.

a. Crude steel production measures the raw steel output, from which finished steel products are made.

below the average for all manufacturing firms except in 1974. This relatively poor performance encourages investors to place their capital in more rewarding pursuits. Indeed, unless the marginal profitability of new steel investment is significantly higher than in alternative pursuits, the national welfare is enhanced if capital flows to those higher-valued uses.

The financial community has responded to the industry's declining financial condition by downgrading steel company bonds. As shown in Table 4, Moody's bond ratings for the top U.S. steel producers have declined significantly since 1982. The ratings are an indication of confidence in the companies' ability to repay, and as such are inversely related to a company's cost of borrowing--that is, interest rates on company-issued debt tend to be

TABLE 3. STEEL INDUSTRY PROFITS

	Before-Tax Profits (billions of current dollars)	After-Tax Profits (billions of current dollars)	After-Tax Profits as a Percent of Stockholder Equity	
			Steel	All Manufac- turing
1970	0.993	0.692	4.3	9.2
1971	1.173	0.748	4.5	9.5
1972	1.650	1.022	6.0	10.3
1973	2.781	1.679	9.6	12.4
1974	5.384	3.151	16.1	14.4
1975	3.453	2.283	10.6	11.3
1976	2.895	2.086	8.9	13.6
1977	1.055	0.861	3.6	13.8
1978	3.470	2.122	8.8	14.5
1979	3.314	2.186	8.7	15.8
1980	3.325	2.405	8.9	15.2
1981	5.725	3.507	11.3	13.3
1982	-4.949	-3.705	-16.0	9.1
1983	-4.544	-3.746	-18.7	10.2
1984	0.117	-0.379	-2.7	12.2
1985	-0.811	-1.250	-10.2	10.0

SOURCE: Department of Commerce, *Quarterly Financial Review*.

NOTE: In 1973, reporting standards were changed to exclude foreign operations.

TABLE 4. MOODY'S BOND RATINGS OF SELECTED U.S. STEEL PRODUCERS, 1980-1986 ^{a/} ^{b/}

Integrated	February 1980	As of January						June 1986
		1981	1982	1983	1984	1985	1986	
Armco	A	A	A	A2	Baa2	Baa3	Ba2	Ba2
Bethlehem	A	A	A	Baa2	Baa2	Ba1	Ba1	Ba2
Inland	Aa	A	A	Baa2	Baa2	Baa2	Baa2	Baa3
J&L ^{c/}	Ba	Ba	Ba	Ba1	Ba1	Ba1	B3	B2
National	Aa	A	A	Baa3	Ba1	Ba1	B3	B3
Republic ^{c/}	A	A	A	Baa3	Ba1	Ba1	B3	B3
U.S. Steel	Aa	A	A	A3	Baa2	Baa2	Baa2	Baa2
LTV	n.a.	n.a.	n.a.	n.a.	n.a.	B1	B1	B1

SOURCE: *Moody's Bond Record*, various editions, as reported in United States International Trade Commission, *Annual Report Concerning Competitive Conditions in the Steel Industry and Industry Efforts to Adjust and Modernize* (September 1986).

NOTE: n.a. = not applicable.

a. Moody's bond ratings are as follows:

- Aaa: Best quality, carrying the smallest degree of risk.
- Aa: High quality. Ranked together with Aaa as high-grade bonds.
- A: Possessing many favorable investment attributes and considered upper-medium grade obligations.
- Baa: Medium-grade obligations, neither highly protected nor poorly secured.
- Ba: Obligations that have speculative elements; their future cannot be considered well assured.
- B: Generally lacking characteristics of desirable investment.
- Caa: In poor standing; may be in default or may present elements of danger with respect to principal or interest.
- Ca: Speculative in a high degree.
- C: Lowest-rated bonds.

In 1983, Moody's modified its ratings. The numbers place the bond's rating within the alphabetic rating. 1 is preferable to 2, which is preferable to 3.

- b. Ratings of subordinated debentures are not shown, but these have historically been one rating below the bond ratings shown here.
- c. During 1984, Jones and Laughlin (J&L) and Republic merged to form LTV Steel, under the corporate umbrella of LTV Corporation

higher where bond ratings are lower. Significantly, bond ratings are based on expectations about a company's future performance rather than on its history, so lower bond ratings represent a negative appraisal of the industry's financial prospects. In fact, following the decline in financial ratings, the industry experienced a wave of bankruptcies, the most notable being LTV Steel.^{13/}

Any discussion of modernizing the steel industry through new investment elicits the question: how much is enough? What is the likelihood that such investment would return the steel industry to levels of profitability that compare favorably to those of other industries and would be economically viable? An investment goal generated solely from technological criteria may not meet economic standards. In technological terms, improvements in productivity are always desirable because they mean lower costs. But in economic terms, such investment should stop at the point where the expense of investing exceeds the expected benefits. Moreover, the calculation of "the expense of investing" must include the cost of opportunities forgone by not investing elsewhere. Future investment in steelmaking capacity must, in short, compete with other uses of capital, which have outperformed steel investments over nearly two decades. Given the efficiency of today's capital markets, one can expect that if future technological breakthroughs create profitable incentives to invest in steel, adequate investment funds will be available.

13. LTV Steel was formed through the combination of three major steel producers: Jones and Laughlin, Youngstown Sheet and Tube, and Republic Steel.



CHAPTER II

CAPITAL INVESTMENT AND TAXES

The steel industry has occasionally benefited from special tax provisions--most notably, safe harbor leasing under the Economic Recovery Tax Act of 1981 (ERTA) and a special refund under the Tax Reform Act of 1986. By and large, however, its treatment has been comparable to that accorded most manufacturing industries, which have not fared as well under the tax laws as many nonmanufacturing industries. This chapter outlines the treatment of steel under both tax laws.^{1/}

Under ERTA, the steel industry enjoyed the benefits given to all manufacturing industries. The effective tax rate on steel investment was no higher than that on investment in most other industries.

The Tax Reform Act of 1986 provides the industry with mixed incentives. The incentives to disinvest in steel, however, are stronger than those to remain. Steel retains \$7 billion worth of unused tax benefits that can be used to shelter income from profitable activities in or out of steel, which may strengthen the incentives of companies to diversify away from currently unprofitable steelmaking. On the other hand, the transition rules provide large integrated steel producers with a one-time tax refund in the neighborhood of \$500 million, which must be used for steel operations. It seems unlikely, however, that producers will increase their steel activities by that amount.

STEEL UNDER THE OLD LAW

ERTA affected investment in the industry in two ways. First, it provided special incentives for certain activities, including some investments. Second, it introduced a new system of depreciation for corporate assets.

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1. Because of the complexity of the new law and the interactions among its provisions, it is difficult to say what the final result of any one provision will be. Different results may obtain as further details are added to the analysis.

Special Incentives

ERTA did not generally provide special incentives for the steel industry. It offered special consideration to some activities--for example, investments in oil or R&D. Moreover, it enabled a number of industries were able to restructure their corporate forms to make better use of existing benefits--for example, by establishing real estate limited partnerships, which passed depreciation or capital gains benefits on to individual partners. Consequently, more funds went into investments that could make use of these tax benefits, rather than into steel. Investment in commercial real estate rose from 10 percent of fixed nonresidential investment in 1980 to over 14.5 percent by 1985. (Other factors, such as rising land prices, mainly drove this increase, but the favorable tax environment played a substantial role.)

The one provision of ERTA that benefited mature industries such as steel--safe harbor leasing--proved so unpopular generally that it was eliminated within one year of its passage. Safe-harbor leasing allowed corporations with excess tax deductions to sell them to taxpaying corporations that could use them to shelter income. In this sense, it paralleled the limited partnerships that were widely used as tax shelters in industries other than heavy manufacturing. A Congressional study has reported that \$1.1 billion worth of safe-harbor sales were made in ferrous industries before the provision was repealed.^{2/}

Capital Depreciation and Effective Tax Rates

Tax laws also affect investment through the way they treat capital depreciation. One way of measuring the tax burden is to calculate the difference between the before-tax and after-tax rates of return on assets, which may be considered the effective tax rate. As commonly calculated, it is the rate that the average firm in an industry will pay on the income generated by the average capital investment in that industry. Since no individual firm is likely to match the average exactly, the effective tax rate is a hypothetical rate, but it reflects the intent of the Congress more than does the average

2. Joint Committee on Taxation, *Analysis of Safe Harbor Leasing* (June 14, 1982). See also Committee on the Budget, *Tax Expenditures: Relationship to Spending Programs and Background Material on Individual Provisions* (March 17, 1982), pp. 167-170.